

AVERY MEMORIAL SPEECH BY DR. FLETCHER AT UNIVERSITY OF
NEBRASKA'S STUDENT UNION LUNCHEON, JUNE 25, 1971

(INTRODUCTORY REMARKS ASSUMED)

ABOUT 5,000 YEARS AGO AN EGYPTIAN PRIEST LAMENTED, "OUR EARTH
IS DEGENERATE ... CHILDREN NO LONGER OBEY THEIR PARENTS."

HE BECAME SO DISTURBED ABOUT THE IDEA OF THE WORLD GOING TO
RUIN THAT HE HAD THE COMPLAINT INSCRIBED IN STONE FOR POSTERITY
TO PONDER.

WELL, HERE WE ARE ... STILL "DEGENERATING."

EVERYONE SAYS WE ARE, AT ANY RATE.

PARENTS COMPLAIN ABOUT THEIR CHILDREN. THE CHILDREN COMPLAIN
ABOUT THE PARENTS -- THE STATE OF THE WORLD IN GENERAL -- THE
UNITED STATES IN PARTICULAR -- AND ESPECIALLY ABOUT THE
"ESTABLISHMENT." IT'S HARD TO FIND ANYTHING "RIGHT" GOING ON.

ACTUALLY, ALL THESE COMPLAINTS HAVE SOME BASIS IN OBSERVABLE FACT, JUST AS THE ANCIENT EGYPTIAN'S COMPLAINT NO DOUBT RESTED ON OBSERVATIONS OF CONDITIONS IN HIS DAY. I DARE SAY SIMILAR PROBLEMS HAVE EXISTED IN EVERY GENERATION. TODAY, THERE ARE REAL AND TOUGH PROBLEMS RIGHT UNDERFOOT, AND SOME EVEN LARGER AND PERHAPS TOUGHER ONES LOOM AHEAD. MANY WILL ATTEMPT "TO INSCRIBE THEM ON STONE," AS IT WERE FOR FUTURE GENERATIONS TO PONDER, THOUGH THIS HAS DOUBTFUL VALUE FOR OUR CURRENT GENERATION.

WE ARE, ON THE WHOLE, BECOMING TROUBLE "SPECIALISTS." WE ALL HAVE OUR OWN PET PROBLEMS AND THINGS-WRONG-IN-THE-WORLD THAT WE PERSONALLY KNOW ABOUT AND DESIRE TO ATTACK AND ELIMINATE RIGHT AWAY. BUT THE TROUBLE IS, EACH ONE OF US IS SO FILLED WITH HIS OWN UNIQUE VIEW OF WHAT'S WRONG IN THE WORLD, THE NATION, AND THE "ESTABLISHMENT" OR YOUNG PEOPLE THAT WE ARE BEGINNING TO FEEL ANYONE OPPOSING OUR VIEWS IS EITHER DENSE OR OBSTINATE.

WHAT SEEMS TO BE MISSING HERE IS A STRONG POSITIVE ATTITUDE TOWARD THE FUTURE. IT ISN'T ENOUGH TO POINT OUT A WRONG AND BLAME SOMEONE ELSE OR A GENERATION FOR IT. ENVIRONMENTAL POLLUTION, FOR EXAMPLE, IS THE RESULT OF MAN'S INGRAINED HABIT, DATING BACK THOUSANDS OR MORE YEARS, OF REGARDING THE ENVIRONMENT AS A GIGANTIC AUTOMATIC DISPOSAL FOR HIS REFUSE. THE SMOKE THAT BEGAN RISING INTO THE AIR FROM PRIMITIVE HEARTHES CONTINUES TO RISE FROM FACTORY CHIMNEYS AND AUTOMOBILE EXHAUST. ONLY IN THE PAST FEW YEARS HAVE WE LEARNED OF THE MENACE OF THOUSANDS OF CHIMNEYS AND MILLIONS OF CARS. AND THE

STREAMS AND OCEANS, ALSO ONCE THOUGHT TO BE UNLIMITED SINKS TO CARRY AWAY THE EFFLUENTS OF CIVILIZATIONS, ARE NOW SEEN TO BE REACHING THE SATURATION POINT. THEY NOW THREATEN TO UPSET THE ECOLOGICAL BALANCE AND IMPERIL OUR VERY EXISTENCE ON THE PLANET. EVEN TODAY, MANY PEOPLE ARE NOT CONVINCED OF THE DANGER.

SO WHAT WE NEED NOW IS NOT MORE RECRIMINATION. WE MUST EMPHASIZE WAYS AND MEANS TO SOLVE THESE PROBLEMS WITHOUT TEARING DOWN THE FABRIC OF OUR SOCIETY. SOLUTIONS NEED NOT BRING MISERY AND POVERTY TO MULTITUDES OF PEOPLE WHO ARE CONSUMERS BY NECESSITY, AND POLLUTERS BY FORCE OF CIRCUMSTANCE AND CARELESSNESS. THE FACT IS, WE ARE ALL CONTRIBUTING TO POLLUTION OF AIR AND STREAM AND LAND AREAS EVEN WHILE POINTING THE FINGER AT THE MORE OBVIOUS FACTORIES, CARS, AND HIGH ENERGY PRODUCING PLANTS FROM WHICH SOCIETY MUST GET THE ENERGY IT REQUIRES.

ALTHOUGH EMPHASIZING A POSITIVE COURSE TO SOLVE OUR HUGE ENVIRONMENTAL AND SOCIAL PROBLEMS IS THE PRACTICAL APPROACH, IT WILL NOT BE EASY OR ALWAYS SUCCESSFUL.

FOR EXAMPLE, DR. LEE DUBRIDGE, AMONG MANY THOUGHTFUL PEOPLE, NOTES THAT ALONG WITH THE RISE OF SCIENCE AND TECHNOLOGY THERE HAS BEEN A PARALLEL RISE IN TIME AND PLACE OF DEMOCRATIC GOVERNMENTS BASED ON THE RECOGNITION OF THE DIGNITY AND WORTH OF ALL HUMAN BEINGS. PEOPLE WHO CAN UNDERSTAND THE UNIVERSE AND LIFE MORE ACCURATELY CANNOT EASILY IGNORE HUMAN MISERY AND

INJUSTICE. WHEN KNOWLEDGE REPLACES IGNORANCE AND SUPERSTITION, HE OBSERVES, PEOPLE THINK DIFFERENTLY AND ACT DIFFERENTLY.

AT ONE TIME WE LOOKED UPON DISEASE AND POVERTY AS NATURAL CALAMITIES. NOW WE KNOW WE CAN DO SOMETHING TO RELIEVE, MAYBE EVEN ELIMINATE THESE THINGS IN TIME. CERTAINLY DISEASE, BUT POSSIBLY EVEN POVERTY MAY BE ELIMINATED. BUT, SINCE BY DEFINITION THE BOTTOM TEN PER CENT OF RELATIVE POVERTY CANNOT BE ELIMINATED FROM ANY SOCIAL GROUP, IT MAY BE POSSIBLE TO BRING THIS LOWER TEN PER CENT UP CLOSER TO THE MEDIAN. HOPEFULLY, TOO, IT WILL BE POSSIBLE TO PREVENT THE SAME RELATIVELY POOR GROUPS REMAINING SO GENERATION AFTER GENERATION.

THOUSANDS OF YEARS SINCE ANCIENT EGYPT WENT BY BEFORE SCIENCE AND TECHNOLOGY REACHED A POINT WHERE KNOWLEDGE COULD REPLACE IGNORANCE AND SUPERSTITION SUFFICIENTLY TO AFFECT OUR CONCEPTS OF GOVERNMENT, OF MAN, AND OF JUSTICE. THE MODERN DEMOCRATIC FORM OF GOVERNMENT ITSELF IS ONLY TWO HUNDRED YEARS OLD, AND AS YOU CAN SEE, WE HAVE A LONG WAY TO GO YET BEFORE INJUSTICE AND DISEASE, MISERY AND POVERTY ARE ELIMINATED.

BUT THE SUCCESS OF OUR OWN TECHNOLOGY, ESPECIALLY IN LANDING MEN ON THE MOON, HAS MADE US WANT TO SOLVE MANY MORE OF OUR HUMAN PROBLEMS MORE RAPIDLY. THE RISING DETERMINATION TO DO SO SEEMS TO HAVE PARALLELED CLOSELY THE DRAMATIC RISE OF SPACE SCIENCE AND TECHNOLOGICAL ACHIEVEMENTS. INDEED, AS DR. DUBRIDGE POINTS OUT, OUR HUMANE GOALS SEEM TO PROGRESS MORE RAPIDLY THAN THE ABILITY OF OUR SCIENCE AND TECHNOLOGY TO KEEP UP. EVEN OUR ECONOMIC, SOCIAL, AND POLITICAL INSTITUTIONS ARE HARD-PRESSED, AND WITH EVERY SUCCESS OF TECHNOLOGY WE FIND THE GULF BETWEEN WHAT WE CAN DO AND WHAT WE WANT TO DO IS WIDENING. AS A RESULT, THERE IS A GREAT DEAL OF DISAPPOINTMENT AND FRUSTRATION.

WHAT I WANT TO EMPHASIZE IS THAT NEGATIVE ATTITUDES TOWARD THIS STATE OF AFFAIRS WILL NOT HELP. WE CAN, AND ARE, DOING SOMETHING ABOUT THE HUMAN PROBLEMS THAT BESET AMERICA. BUT SOLVING AN APOLLO LUNAR LANDING MISSION, AS NASA DID, IS RELATIVELY SIMPLE COMPARED WITH PRESERVING THE ECOLOGY OR PARTICULARLY WITH SOLVING URBAN BLIGHT.

APOLLO WAS A STRAIGHTFORWARD SCIENTIFIC AND ENGINEERING PROBLEM. THERE WERE NO PEOPLE PROBLEMS OF THE KIND THAT FACE STATE AND FEDERAL GOVERNMENTS IN SAVING THE CITIES AND THE ECOLOGY. IN APOLLO, THE GOAL WAS SIMPLE AND CLEARLY UNDERSTOOD BY ALL PARTICIPANTS. THE REVERSE IS TRUE REGARDING THE CITIES AND ECOLOGY. WHERE A CLEAR CONSENSUS EXISTED IN APOLLO, THERE IS NO SUCH CONSENSUS ON SOLUTION OF SOCIAL AND POLITICAL PROBLEMS.

THE COSTS OF LANDING MEN ON THE MOON AND BRINGING THEM BACK TO EARTH COULD BE, AND WERE, QUITE CLOSELY ESTIMATED RELATIVE TO THE ACTUAL COSTS MORE THAN FIVE YEARS BEFORE THE APOLLO 11'S FIRST GREAT ACHIEVEMENT. BUT WHO CAN ESTIMATE THE COSTS AS ACCURATELY FOR REHABILITATING OUR CITIES AND CLEANING UP THE ENVIRONMENT? NOT ONLY IS THERE NO RELIABLE YARDSTICK TO MEASURE THE REQUIREMENTS, THERE IS NO VIABLE AGREEMENT ON THE REQUIREMENTS TO BE MEASURED.

THIS DOES NOT MEAN THE CASE IS HOPELESS, BY ANY MEANS. WE ARE A RICH AND POWERFUL COUNTRY, WITH THE MOST ADVANCED TECHNOLOGY, AND THE GREATEST CAPACITY FOR DOING GOOD WORKS OF ANY NATION IN THE WORLD. THE BIG MAJORITY OF AMERICANS ARE INDUSTRIOUS, PROGRESSIVE, INNOVATIVE, COMPASSIONATE, GENEROUS AND COURAGEOUS.

THERE WILL BE ANSWERS TO OUR PROBLEMS. DESPITE APPEARANCES SOMETIMES TO THE CONTRARY, WE ARE A PROBLEM-SOLVING PEOPLE. BUT NOT ALL OF TODAY'S PROBLEMS ARE GOING TO BE SOLVED TODAY. PERHAPS TOMORROW OR THE NEXT DAY, BUT NOT TODAY.

POPULATION CONTROL, ENVIRONMENTAL POLLUTION, CRIME, STARVATION, URBAN DECAY, DIMINISHING RESOURCES -- OR WHATEVER -- AS LONG AS PEOPLE ARE A FACTOR, WE HAVE ONE BIG "PEOPLE INTERACTION" PROBLEM. A SOLUTION FOR ONE PART OF THIS PROBLEM OFTEN AGGRAVATES ANOTHER PART OF IT. YOU GET HOLD OF THE TAIL AND THE OTHER END GROWLS. CATCH IT BY THE THROAT, AND YOU GET CLAWED. THERE IS NO EASY OR QUICK WAY OUT.

TAKE FOOD AND THE PROBLEMS OF STARVATION. AMERICA HAS DEVELOPED PROBABLY THE MOST EFFICIENT FOOD PRODUCTION SYSTEM IN THE WORLD. BUT IT DEPENDS HEAVILY ON CHEMICAL FERTILIZERS AND PESTICIDES. ECOLOGISTS ARE INCREASINGLY CRITICAL OF WHAT THESE ARE DOING TO THE ECOLOGY, AND RIGHTLY SO. YET, UNTIL HARMLESS SUBSTITUTES FOR CHEMICAL FERTILIZERS AND PESTICIDES ARE FOUND -- AND USED -- WE HAVE THE CHOICE BETWEEN LESS FOOD PRODUCTION OR CONTINUED POLLUTION.

GENERALLY, THERE IS AN OVER-ESTIMATION OF WHAT CAN BE TECHNOLOGICALLY ACCOMPLISHED TODAY, AND AN UNDER-ESTIMATION

OF WHAT CAN BE DONE IN THE FUTURE. WHEN THE PUBLIC SEES THAT WE CAN PUT MEN ON THE MOON INSIDE OF EIGHT YEARS OR SO, IT WANTS TO KNOW WHY WE CAN'T SOLVE OUR EARTHLY PROBLEMS JUST AS QUICKLY.

A GOOD QUESTION. BUT AS I HAVE MENTIONED BEFORE, THE STRAIGHTFORWARD TECHNOLOGICAL PROBLEMS ARE RELATIVELY SIMPLE, EVEN THE APOLLO LUNAR MISSION. THE PROBLEMS INVOLVING SOCIETY, HOWEVER, EVEN THOUGH MANY OF THESE INVOLVE TECHNOLOGY, TAKE LONGER BECAUSE THEY ARE ESSENTIALLY POLITICAL AND REQUIRE A CONSENSUS THAT IS HARDER TO COME BY.

I DON'T BELIEVE THERE IS A CONSENSUS ON HOW TO STOP URBAN DECAY. WE ALL SEE MUCH OF WHAT IS WRONG, BUT WE DON'T AGREE ON WHAT TO DO ABOUT IT. I DOUBT THE ANSWER IS JUST TO POUR MORE MONEY INTO THE CITIES, ALTHOUGH IT MIGHT HELP. WHAT IS NEEDED IS A CLEAR AGREEMENT ON GOALS AND ON THE MEANS TO ACHIEVE THEM. THEN ONCE APPROPRIATE POLITICAL MECHANISMS ARE SET UP TECHNOLOGY AND MONEY CAN GO TO WORK ON THE PROBLEM.

WHERE THE GENERAL PUBLIC TENDS TO OVER-ESTIMATE OUR EXISTING CAPABILITIES, SCIENTISTS TEND TO UNDER-ESTIMATE WHAT WE CAN DO IN THE FUTURE. IN 1903, SIMON NEWCOMB, FAMOUS MATHEMATICIAN AND ASTRONOMER OF THE TIME, DECLARED THAT:

"AERIAL FLIGHT IS ONE OF THAT CLASS OF PROBLEMS WITH WHICH MAN WILL NEVER BE ABLE TO COPE."

A FEW MONTHS LATER IN THE SAME YEAR, TWO BICYCLE-MAKERS FROM DAYTON MADE HIM EAT HIS WORDS. THE WRIGHT BROTHERS FLEW THE FIRST POWERED AIRPLANE AT KITTY HAWK, N. C., ON DECEMBER 17, 1903.

IN 1910, ANOTHER ASTRONOMER -- I DON'T KNOW WHY ASTRONOMERS FELT SO COMPELLED TO OFFER OPINIONS ABOUT AERONAUTICAL DEVELOPMENT -- ANOTHER ASTRONOMER, WILLIAM H. PICKERING, LOOKING AT THE RICKETY, FRAGILE AIRPLANES OF THE DAY, DERIDED THE POPULAR CONCEPTION OF GIGANTIC FLYING MACHINES SPEEDING ACROSS THE ATLANTIC, CARRYING INNUMERABLE PASSENGERS TO THE OTHER SIDE.

"IT SEEMS SAFE TO SAY," HE FELT SAFE IN SAYING, "THAT SUCH IDEAS ARE WHOLLY VISIONARY. EVEN IF A MACHINE COULD GET ACROSS WITH ONE OR TWO PASSENGERS, THE EXPENSE WOULD BE PROHIBITIVE TO ANY BUT THE CAPITALIST WHO COULD USE HIS OWN YACHT."

BUT EVEN AVIATION PIONEERS OF THE EARLY DAYS OF FLIGHT COULD NOT SEE THE AIRPLANE'S FUTURE CAPABILITIES ANY BETTER. OCTAVE CHANUTE, WHO LATER HAD AN AIRFIELD NAMED AFTER HIM, THOUGHT IT WOULD BE USED ONLY IN SPORT. "THEY ARE NOT TO BE THOUGHT OF AS COMMERCIAL CARRIERS," CHANUTE SAID IN 1904.

TEN YEARS LATER, THE FIRST REGULAR U. S. DOMESTIC AIR PASSENGER SERVICE WAS STARTED BETWEEN ST. PETERSBURG AND TAMPA, FLORIDA.

NOWADAYS, THE ONCE WHOLLY "VISIONARY" ATLANTIC FLIGHTS ARE SO COMMONPLACE THAT THEY ARE TAKEN FOR GRANTED. THE WRIGHT BROTHERS' FIRST AIRPLANE, WHICH FLEW ABOUT 120 FEET 10 FEET ABOVE THE GROUND, COULD MAKE THE SAME FLIGHT AT THE SAME ALTITUDE INSIDE THE BOEING 747'S FUSELAGE TUBE, AND STILL LAND 105 FEET SHORT OF THE BIG TRANSPORT'S COCKPIT. THE ONLY CHANGE NEEDED IN THE PIONEER CRAFT WOULD BE TO CLIP A BIT OFF THE ENDS OF THE WINGS.

THE EXPERTS' DISMAL RECORD OF FORECASTING THINGS TO COME HAS NOT IMPROVED WITH EXPERIENCE. USUALLY, THE SCIENCE-FICTION WRITERS ARE CLOSER TO THE MARK.

FORMER NASA ADMINISTRATOR JIM WEBB TELLS THE STORY THAT IN 1957 HE GAVE A COMMENCEMENT ADDRESS IN WHICH HE QUOTED A TIMETABLE FOR SPACE EXPLORATION THAT HAD BEEN DRAFTED BY A LEADER IN THE AEROSPACE INDUSTRY. BY THE YEAR 1970, THIS AUTHORITY HAD PREDICTED, A MAN-MADE SATELLITE WOULD CIRCLE THE EARTH AND THE MOON. ABOUT 1990, HE ADDED, A SPACESHIP CARRYING HUMAN BEINGS WOULD ORBIT THE EARTH, AND HE SUGGESTED THAT SHORTLY AFTER THE YEAR 2000, MEN MIGHT LAND ON THE MOON AND RETURN TO EARTH.

THE IRONY OF IT ALL WAS THAT THE MAN WHO ENVISIONED THIS TIMETABLE WAS JAMES S. McDONNELL, PRESIDENT OF THE FIRM THAT PRODUCED NASA'S MERCURY CAPSULES WHICH CARRIED THE FIRST AMERICAN IN EARTH ORBIT, ANTICIPATING HIS EARLIER SCHEDULE BY ALMOST 30 YEARS. THE FIRST MANNED MERCURY ORBITAL FLIGHT WAS ACHIEVED BY JOHN GLENN IN 1962. EVEN SO, THE RUSSIANS WERE FIRST BY ORBITING A MAN A YEAR EARLIER. TO ROUND OUT THE PICTURE, OUR MANNED LUNAR LANDING ALSO BEAT THE McDONNELL SCHEDULE BY MORE THAN 30 YEARS.

LOOKING AT THE RECORD OF EXPERTS CONFIDENTLY PREDICTING A NEGATIVE VIEW OF OUR FUTURE TECHNOLOGICAL CAPABILITIES — AND WE HAVE CITED ONLY A FEW HERE — I WONDER AT THE TEMERITY OF ANYONE WHO WOULD FORECAST ANYTHING FURTHER.

HOWEVER, THERE IS SAID TO BE AT LEAST ONE INSTANCE ON RECORD OF AN EXPERT WITH GENUINE FAR-SIGHTEDNESS. SENATOR MIKE GRAVEL OF ALASKA RELATES THAT A REPORT PREPARED BY THE SENATE OF GENOA ON COLUMBUS' AUDACIOUS PROPOSAL TO SAIL WEST TO DISCOVER THE INDIES AND CATHAY WAS FOUND IN A MONASTERY IN SPAIN. THE REPORT CONTAINED A BRIEF REFERENCE TO ONE MEMBER OF THE GENOESE COMMITTEE DESCRIBED AS A "RASH AND IMPETUOUS YOUNG ENGINEER WHO SHOWED HIS IMMATURETY AND POOR JUDGMENT BY ADVOCATING THAT THE VOYAGE BE UNDERTAKEN IMMEDIATELY. SENATOR GRAVEL THEN QUOTED FROM THE REPORT:

"INVESTIGATION PROVED HIM TO BE QUITE ECCENTRIC (HE TALKS OF FLYING MACHINES AND FANCIES HIMSELF AN ARTIST), AND HE WAS THEREFORE DISMISSED FROM THE COMMITTEE. HE IS THE SON OF A FLORENTINE NOTARY ... HIS NAME IS LEONARDO DA VINCI."

IN THIS CASE, THE EXPERT WAS NOT CONSIDERED SO BY THE GENOESE LEGISLATIVE COMMITTEE MEMBERS. LEONARDO ONLY BECAME ONE SUBSEQUENTLY.

NOW WE HAVE CRITICS WHO ARE SAYING THAT THE U. S. PROPOSED SPACE SHUTTLE IS ONLY GOING TO BE A WASTE OF MONEY, AND THAT THERE IS NO FUTURE FOR MANNED SPACE FLIGHT ANYWAY. BUT WHO CAN IMAGINE WHAT THE SHUTTLE WILL MEAN TO MAN'S FUTURE CAPABILITIES IN SPACE? OR WHAT THE WORLD WILL BE 15, 20, OR 30 YEARS FROM NOW? IT IS POSSIBLE THAT THE MULTIPLE-MISSION SHUTTLE WILL FILL A GREAT NEED FOR EARTH'S PEOPLE OF WHICH WE HAVE NO HINT TODAY, AS THE GENOESE COMMITTEE COULD NOT ENVISION IN THEIR DAY OF THINGS TO COME. WHO CAN BE SURE THAT A POWERFUL FLIGHT CAPABILITY THAT PROMISES FOR THE FIRST TIME TO SIGNIFICANTLY REDUCE THE COST OF SPACE FLIGHT AND PROVIDE A WIDER FLEXIBILITY OF USE TO HUMAN ACTIVITIES IS NOT WORTH BUILDING? IS IT WISDOM SPEAKING THAT DESCRIBES FLIGHT IN SPACE BY MAN AS MERELY A STUNT AND SATISFIES ONLY HIS EGO?

THE SAME WAS SAID OF THE AIRPLANE BY INFLUENTIAL PEOPLE IN THIS COUNTRY UP TO WORLD WAR I. THEN SUDDENLY

THE AIRPLANE BECAME AN URGENT REQUIREMENT. AN OLDER EXAMPLE -- WE CANNOT EVEN TODAY FORECAST FURTHER USES FOR THE PRINCIPLE OF THE WHEEL WHICH WAS DEVELOPED BEFORE THE DAWN OF HISTORY. I AM CERTAIN THE DISCOVERER OF THIS PRINCIPLE NEVER ONCE THOUGHT THAT THOUSANDS OF YEARS LATER IT WOULD BE USED IN A SPACE ROCKET. NOR, I AM SURE, DID IT EVER OCCUR TO OUR UNKNOWN BENEFACTOR THAT HIS PRINCIPLE WOULD SUSTAIN LATER CIVILIZATIONS, WITHOUT WHICH THEY WOULD NOW COLLAPSE, UNABLE TO ADEQUATELY PROVIDE THE NECESSITIES OF LIFE TO THEIR PEOPLE.

THE SPACE PROGRAM IS NOT ENTIRELY IRRELEVANT TO THE PROBLEMS OF SOCIETY. IN FACT, SOME OF THE SPACE ACTIVITIES IN WHICH NASA IS ENGAGED ARE EXPECTED TO MAKE VITAL CONTRIBUTIONS TOWARD RESOLVING MANY PROBLEMS NOW CONSIDERED TO HAVE PRIORITY OVER ALMOST EVERYTHING ELSE, INCLUDING THE SPACE PROGRAM ITSELF.

JUST YESTERDAY, FOR EXAMPLE, THE PRESIDENT WITH SECRETARY HARDIN PAID A VISIT TO A NASA OPERATED RB 57 - THE CORN BLIGHT AIRCRAFT.

POLLUTION CONTROL, INCREASED FOOD PRODUCTION, CONSERVATION OF RESOURCES, URBAN PLANNING, DISCOVERY OF NEW FRESH WATER SOURCES AND MINERALS, ADVANCED WEATHER FORECASTING ACCURATE UP TO TWO WEEKS, CROP AND FORESTRY MONITORING, ARE OBJECTIVES IN OUR SPACE PROGRAM. ADDITIONAL POSSIBILITIES, PERHAPS FURTHER OFF -- ARE WARNING OF IMMINENT VOLCANIC ERUPTIONS AND EARTHQUAKES. ALL OF THESE AND MANY OTHERS ARE INCLUDED AMONG NASA PROJECTS.

THAT WE CAN DO SOMETHING CONSTRUCTIVE TO PRESERVE AND CONSERVE EARTH'S ENVIRONMENT AND RESOURCES ON WHICH WE ALL DEPEND FOR LIFE, AND TO PROVIDE THE MEANS BY WHICH ALL MAY SHARE MORE EQUABLY IN THESE NECESSITIES, IS NOW POSSIBLE THROUGH THE MEDIUM OF SPACE. EARTH CAN BE MADE MORE LIVABLE AND ENJOYABLE BY USING THE SPECIAL POWERS CONFERRED BY SPACE FLIGHT TECHNOLOGY.

NASA HAS BEEN DEVELOPING A SERIES OF SPACE PROJECTS BY WHICH ALL MANKIND MAY REALIZE THE BENEFITS OF SPACE AS AND WHEN IT CHOOSES. THREE OF THE MAJOR AREAS IN WHICH SPACE TECHNOLOGY ARE ALREADY BEING APPLIED TO ADVANCE THIS CAPABILITY ARE IN EARTH PHENOMENA OBSERVATIONS, COMMUNICATIONS BY SATELLITE, AND METEOROLOGY.

IN EACH OF THESE AREAS, NASA IS CONTRIBUTING A STRONG EFFORT TO DEVELOP THE SPACECRAFT AND SYSTEMS, THE TECHNIQUES AND OPERATIONAL EXPERIENCE WHEREBY SPACE CAN BE PLACED AT THE SERVICE OF MANKIND. A LARGE PART OF THIS EFFORT IS SHARED BY MANY COUNTRIES AND PEOPLE THROUGHOUT THE WORLD.

AMONG THE PROGRAMS IN THE THREE AREAS MENTIONED ARE

- 1) THE EARTH RESOURCES TECHNOLOGY SATELLITE, DESIGNED TO SURVEY EARTH PHENOMENA AND TO HELP US UNDERSTAND OUR ECOLOGY;
- 2) APPLICATIONS TECHNOLOGY SATELLITES, A SERIES OF SPACE-CRAFT IN WHICH EXPERIMENTS IN IMPROVED SPACE COMMUNICATIONS,

NAVIGATION AND METEOROLOGY ARE PERFORMED; AND 3) NIMBUS AND IMPROVED TIROS, DESIGNED TO ADVANCE WEATHER DATA GATHERING AND SATELLITE TECHNOLOGY.

THE EARTH RESOURCES TECHNOLOGY PROGRAM IS INTENDED TO SUPPLY A COMPLETE RESOURCES MAP OF THE UNITED STATES ABOUT EVERY TWO WEEKS. THIS WILL INCLUDE CROPS, FRESH WATER SOURCES, LIKELY AREAS FOR MINERAL DEPOSITS, OIL AND NATURAL GAS, OCEANOGRAPHIC DATA, AND MANY OTHER TYPES OF INFORMATION. ECOLOGISTS SHOULD BE ABLE TO LOCATE SOIL EROSION AND TO PINPOINT ENVIRONMENTAL POLLUTION WHEREVER IT OCCURS -- EVEN IN WATERWAYS AND IN THE AIR. EARLY EXPERIMENTAL MISSIONS WILL BE CONFINED TO SPECIFIC AREAS OF INTEREST. THE FIRST TWO SATELLITES ARE PLANNED FOR LAUNCH IN 1972 AND '73.

OBJECTIVES OF OUR APPLICATIONS TECHNOLOGY SATELLITES (ATS) ARE TO DEVELOP AND FLIGHT TEST A VARIETY OF TECHNOLOGIES TO MAKE PRACTICAL USE OF SPACE, AND TO DEMONSTRATE PROMISING CONCEPTS FOR SPACE APPLICATIONS.

THE LATEST SPACECRAFT IN THIS SERIES ARE ATS-F AND -G. THESE ARE TO BE LAUNCHED IN "STATIONARY" ORBIT OF THE EARTH IN 1973 AND 1975, RESPECTIVELY. THESE SPACECRAFT WILL INCLUDE AMONG THEIR BASIC CAPABILITIES EXPERIMENTS FOR COMMUNITY BROADCASTING FOR INSTRUCTION AND EDUCATION.

TWO IMPORTANT USES OF ATS-F WILL BE THE TRANSMISSION OF EDUCATIONAL AND HEALTH PROGRAMMING TO A NUMBER OF GROUND RECEIVERS DISTRIBUTED IN THE ROCKY MOUNTAIN REGION AND ALASKA WHERE TV RECEPTION IS EITHER SPARSE OR ABSENT BECAUSE THE COMMUNITIES ARE IN REMOTE AREAS. THE RECEIVERS WILL BE LOCATED IN SCHOOLS AND PUBLIC INSTITUTIONS.

WE PLAN TO OPERATE ATS-F OVER THE U. S. FOR THIS PURPOSE DURING THE FIRST YEAR AFTER LAUNCH TO CARRY OUT THE EXPERIMENTS WHICH ARE THE RESULT OF A JOINT PROPOSAL TO NASA BY THE DEPARTMENT OF HEALTH, EDUCATION AND WELFARE, AND THE CORPORATION FOR PUBLIC BROADCASTING. EIGHTEEN OTHER TECHNOLOGICAL AND APPLICATIONS EXPERIMENTS PLANNED FOR THIS SATELLITE WON'T BE AFFECTED BY THE ADDITION OF THE NEW EXPERIMENTS FOR HEW AND CPB.

A SIMILAR EXPERIMENT IS ALSO PLANNED FOR INDIA IN WHICH THE INDIAN GOVERNMENT WILL BROADCAST INSTRUCTIONAL TV PROGRAMS TO SOME 5,000 VILLAGES.

ALL THAT IS REQUIRED FOR GROUND RECEPTION FROM ATS-F TO BE PUT INTO STATIONARY ORBIT 22,300 MILES ABOVE THE EARTH, IS AN ANTENNA COSTING ABOUT \$200.

NOW THERE ARE A HOST OF OTHER EXPERIMENTS NASA IS CARRYING OUT IN SPACE, BOTH IN EARTH ORBIT AND DEEP SPACE,

WHICH EVENTUALLY WILL BENEFIT NOT ONLY AMERICANS BUT ALL MANKIND. THERE ARE APPARENTLY LIMITLESS RESOURCES OF KNOWLEDGE IN SPACE, A GREAT DEAL OF WHICH NOT ONLY IS INTERESTING TO KNOW, BUT IS OF SIGNIFICANCE TO MAN, TO EARTH'S ENVIRONMENT, AND TO ECOLOGY. WE ARE LEARNING OF THE RELATIONSHIPS BETWEEN SUN AND EARTH AND BETWEEN THE EARTH AND THE MOON AND THEIR EFFECTS ON OUR LIVES WHICH CAN BE LEARNED IN NO OTHER WAY SAVE BY MEANS OF THE ROCKET AND AUTOMATED OR MANNED SPACECRAFT. NEVERTHELESS, THROUGHOUT HISTORY NEW IDEAS AND NEW DISCOVERIES HAVE ALWAYS HAD TO FACE SEVERE OPPOSITION BEFORE THEIR VALUE IS FINALLY ACCEPTED. SO PERHAPS IT IS NOT SURPRISING THAT AMONG CERTAIN SOCIAL PHILOSOPHERS, CULTURAL HISTORIANS, AND THE LIKE, THERE CAN BE FOUND A VERY NEGATIVE ATTITUDE TOWARD THE SPACE PROGRAM. THEIR TEACHINGS AND PUBLISHED WORKS GIVE A VERY DISTORTED VIEW OF SCIENCE AND TECHNOLOGY, AS WELL AS OF SPACE ACTIVITIES WHICH ARE PICTURED AS CAUSING THE DOWNFALL OF MANKIND.

ONE FAMOUS HISTORIAN AND PHILOSOPHER HAS ASKED WHETHER "SPACEMANSHIP FOLLY" ISN'T ALSO A CRIME BECAUSE IT WASTES THAT "SLENDER SURPLUS PRODUCT THAT MAN HAS SUCCEEDED IN WRINGING OUT OF NATURE WITHIN THE PAST 5,000 YEARS." HE

NEGLECTED TO MENTION JUST WHAT THAT "SLENDER SURPLUS PRODUCT" IS THAT WE ARE SUPPOSED TO BE WASTING.

THE NASA PROGRAM IS, ON THE CONTRARY, ONE OF THE MOST TECHNOLOGICALLY AND SCIENTIFICALLY STIMULATING PROGRAMS EVER DEvised. IT IS PROVIDING NEW KNOWLEDGE AND CAPABILITIES THAT WE ARE GOING TO NEED IF SOME OF THE SIGNIFICANT PROBLEMS HERE ON EARTH ARE TO BE SOLVED. OUR SPACE ACTIVITIES ALSO ARE A FORM OF INSURANCE THAT WE SHALL BE BETTER EQUIPPED TO MEET UNKNOWN REQUIREMENTS OF THE FUTURE.

EXPLORATION AND DISCOVERY ARE VITAL TO INTELLECTUAL GROWTH AND IMAGINATION, BOTH OF WHICH ARE PRIME CHARACTERISTICS OF HUMAN BEINGS. THE DESIRE TO KNOW, WHICH IS BASIC TO EXPLORATION, IS A POWERFUL URGE THAT HELPS MANKIND ADAPT TO CHANGING ENVIRONMENT AND MEET THE CHALLENGES THAT CIRCUMSTANCES CONTINUALLY RAISE TO EACH GENERATION.

THE SPACE PROGRAM IS PERHAPS THE MOST POWERFUL TOOL THAT HAS EMERGED FROM TECHNOLOGY TO ENABLE EARTH PEOPLE TO BETTER MEET THOSE CHALLENGES NOW AND IN THE FUTURE. IT IS PROVIDING BOTH KNOWLEDGE AND NEW CAPABILITIES NEVER BEFORE POSSESSED. A BROAD NEW FRONTIER IS OPENED TO THE HUMAN SCOPE OF OPPORTUNITIES THAT CAN BENEFIT NOT AMERICANS ALONE, BUT ALL THE WORLD. THIS KNOWLEDGE AND CAPABILITY THAT ARE NOW BEING PIONEERED CONSTITUTE OUR PRIMARY LEGACY TO FUTURE GENERATIONS AND IN MY JUDGMENT A MUCH MORE PROFOUND LEGACY THAN STONE TABLETS.